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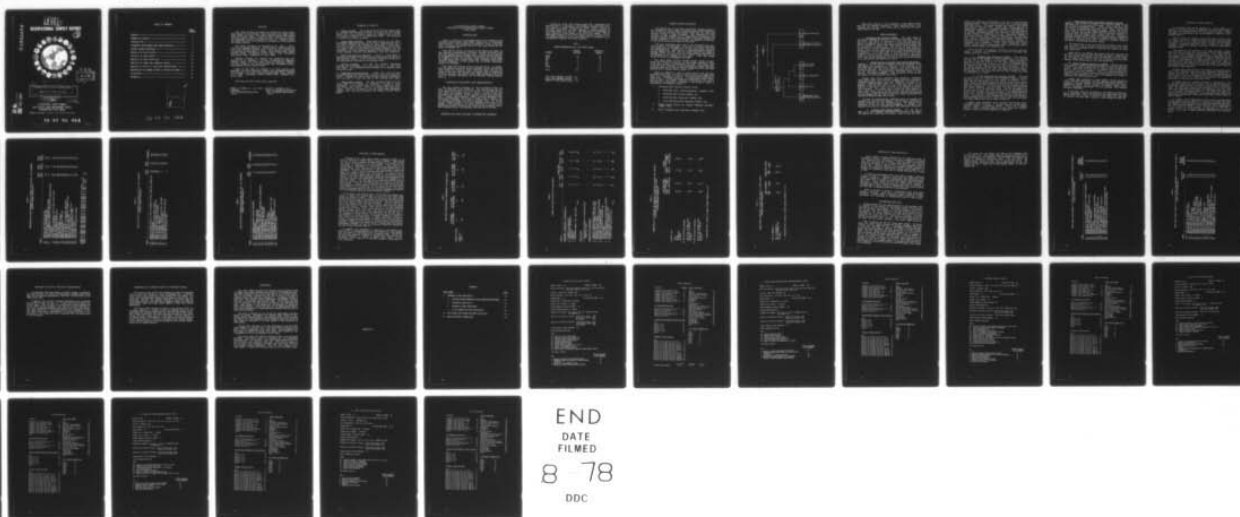
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CRYOGENIC FLUIDS PRODUCTION CAREER LADDER AFSCS 54430, 54450, A--ETC(U)
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OCCUPATIONAL SURVEY REPORT

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CRYOGENIC FLUIDS PRODUCTION CAREER LADDER
AFSCs 54430, 54450, and 54470.

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OCCUPATIONAL SURVEY BRANCH
USAF OCCUPATIONAL MEASUREMENT CENTER
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PREFACE

This report presents the results of a detailed Air Force Occupational Survey of the Cryogenic Fluids Production career ladder (AFSCs 54430, 54450, and 54470). This project was directed by USAF Program Technical Training, Volume 2, dated July 1976. Authority for conducting occupational surveys is contained in AFR 35-2. Computer outputs from which this report was produced are available for use by operating and training officials.

The survey instrument was developed by Mr. James L. Slovak, Inventory Development Specialist. Captain David S. Street analyzed the survey data and wrote the final report. This report has been reviewed and approved by Major Walter F. Kasper, Chief, Airman Career Ladders Analysis Section, Occupational Survey Branch, USAF Occupational Measurement Center, Lackland AFB, Texas, 78236.

Computer programs for analyzing the occupational data were designed by Dr. Raymond E. Christal, Occupational and Manpower Research Division, Air Force Human Resources Laboratory (AFHRL), and were written by the Project Analysis and Programming Branch, Computational Sciences Division AFHRL.

Copies of this report are available to air staff sections, major commands, and other interested training and management personnel upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Survey Branch (OMY), Lackland AFB, Texas, 78236.

This report has been reviewed and is approved.

JAMES A. TURNER, Jr., Col, USAF
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SUMMARY OF RESULTS

1. Survey Coverage. The Cryogenic Fluids Production career ladder job inventory was administered during the period June 1977 through August 1977. Survey results are based on responses from 157 of the 270 incumbents assigned to the 544X0 career ladder. This represents 71 percent of all assigned personnel.
2. Career Ladder Structure. Ninety-eight percent of the survey respondents comprised one major cluster and two independent job types. The cluster contained four separate job types where a great deal of work time was spent in the maintenance and operation of various types of cryogenic fluids production plants and support equipment. The two independent job types contained personnel involved with storage and support equipment operation and maintenance, and senior supervisors.
3. DAFSC and Experience Differences. There is a high degree of similarity and overlap in the kinds of tasks performed by all skill level and experience groups. At the 7-skill level, 58 percent of the time is still being spent on maintenance and operations tasks.
4. AFR 39-1 Evaluation. The AFR 39-1 specialty descriptions generally give a thorough and accurate picture of 3-, 5-, and 7-skill level duties. They accurately portray the high level of similarity found across skill levels.
5. Comparison to Previous Survey. Overall, there were few major differences between the results of the current survey and the previous survey. Although the career ladder has been reduced in manning by more than half, the basic jobs seem to have remained fairly stable.
6. Career Ladder Problems. The most pressing problem for this career ladder is an attrition rate attributed to the lack of CONUS assignments. Several attempts have been made to combine the ladder with related career ladders. However, all attempts have been unsuccessful. There do not appear to be any career ladder management problems other than those associated with multiple overseas assignments.

OCCUPATIONAL SURVEY REPORT
CRYOGENIC FLUIDS PRODUCTION CAREER LADDER
(AFSC 544X0)

INTRODUCTION

This is a report of an occupational survey of the Cryogenic Fluids Production Career Ladder (AFSC 544X0) completed by the Occupational Survey Branch, USAF Occupational Measurement Center, during May 1978. The previous occupational survey of this career ladder was completed in December 1973.

→ Since the 1973 survey, the manning in the 544X0 career ladder has been reduced by approximately 50 percent, although the kinds of jobs and tasks performed have remained stable. A large overseas imbalance in the assignments within this ladder has resulted in several unsuccessful attempts to merge the Cryogenic Fluids Production career ladder with some larger career ladders having more Continental United States (CONUS) assignments. At the present time, no further classification actions are in progress.

↑ This report will basically address three major areas: (1) development and administration of the survey instrument; (2) the job structure found within the Cryogenic Fluids Production ladder and how this relates to skill level and experience level groups; and (3) comparisons of the job structure with current career ladder documents such as the AFR 39-1 Specialty Descriptions and the Specialty Training Standard (STS).

INVENTORY DEVELOPMENT AND ADMINISTRATION

The data collection instrument for this occupational survey was USAF Job Inventory AFPT 90-544-315. The task list from the 1973 study served as the basis for the new task list. The previous task list was revised and updated through a review of current career field publications and directives, and by personal in-depth group interviews with 17 subject matter-specialists (SMS's) from two operational bases (Dyess and Bergstrom), the technical training school at Chanute, and the Specialty Knowledge Test team at Lackland AFB. The current survey instrument consists of 502 task statements grouped into 14 duty sections. Also included in the survey instrument is a series of 116 background variables relating to such factors as job satisfaction indices, time in military service, and equipment and tools used on the job.

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During the period June through August 1977, consolidated base personnel offices in operational units worldwide administered the inventory booklets to airmen holding DAFSC 544X0. Table 1 reflects the percentage distribution, by major command, of assigned personnel in the career ladder as of July 1977. Also reflected is the distribution by major command of airmen making up the final survey sample. The 157 respondents making up the survey sample represent 71 percent of the 220 assigned personnel in the career ladder and is considered to be a representative sample of the overall population.

TABLE 1

COMMAND REPRESENTATION OF 544X0 SURVEY SAMPLE

<u>COMMAND</u>	<u>PERCENT ASSIGNED</u>	<u>PERCENT OF SAMPLE</u>
USAFE	51	53
PACAF	25	19
MAC	7	8
TAC	6	6
ATC	5	7
AAC	5	5
OTHER	<u>1</u>	<u>2</u>
TOTAL	100	100

TOTAL 544X0 PERSONNEL ASSIGNED - 220
 TOTAL 544X0 PERSONNEL SAMPLED - 157
 PERCENT OF 544X0 AIRMEN SAMPLED - 71%

CAREER LADDER STRUCTURE

An essential part of the USAF Occupational Analysis program is the examination of career ladder personnel in terms of the actual structure of the job functions they perform rather than the career field structure outlined in official documents. This examination of actual structure is made possible by the Comprehensive Occupational Data Analysis Programs (CODAP) which generate a hierarchical clustering of all jobs performed in the field based upon the similarity of tasks performed and the relative time spent on these tasks.

The basic identifying group used in the hierarchical job structuring analysis is the Job Type. A job type is a group of individuals who perform many of the same tasks and also spend similar amounts of time performing them. When there is a substantial degree of similarity between different job types, they are grouped together and labeled as Clusters. Finally, there are often cases of specialized job types that are too dissimilar to be grouped into any cluster. These fairly unique groups are labeled as Independent Job Types.

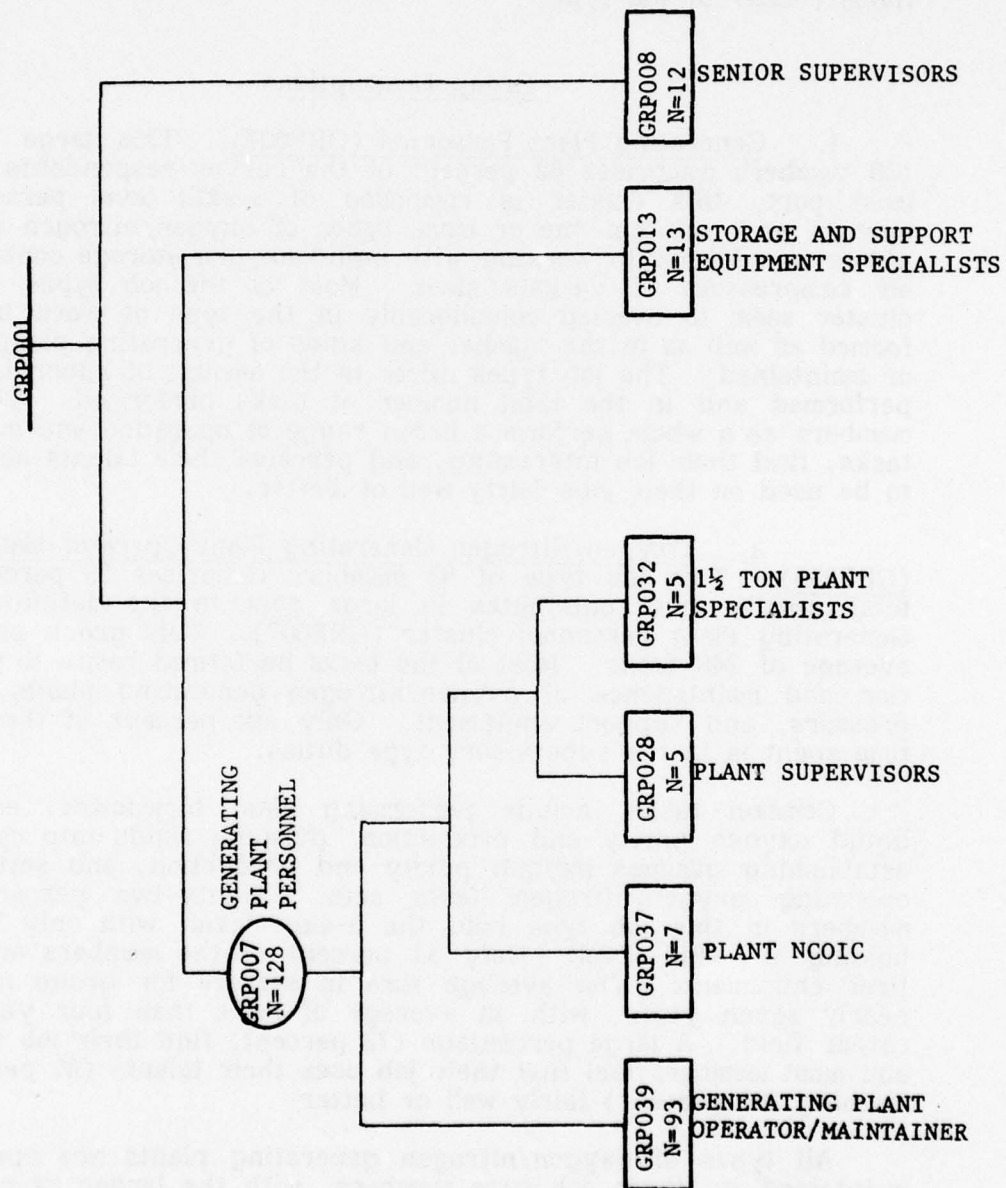
The career ladder structure analysis process consists of determining the functional job structure of career ladder personnel in terms of job types, clusters, and independent job types. Each group is described in terms of similarity of tasks performed and relative time spent performing them and in terms of whatever background factors the group members have in common (DAFSC, grade, etc.).

Based on similarity in terms of tasks performed and time spent performing these tasks, the structure of actual jobs in the 544X0 career ladder is as illustrated in Figure 1. The major groups identified are listed below. A detailed description of representative duties, distinguishing tasks, and common background characteristics for each of these groups is presented in Appendix A, and should be viewed in relationship to the diagram in Figure 1.

- I. Generating Plant Personnel (GRP007, N=128)
 - a. Generating Plant Operator-Maintainers (GRP039, N=93)
 - b. Generating Plant NCOICs (GRP037, N=7)
 - c. Generating Plant Supervisors (GRP028, N=5)
 - d. 1½ Ton Generating Plant Specialists (GRP032, N=5)
- II. Liquid Oxygen Storage and Support Equipment Specialists (GRP013, N=13)
- III. Senior Cryogenics Plant Supervisors (GRP008, N=12)

FIGURE 1

CRYOGENIC FLUIDS PRODUCTION CAREER LADDER STRUCTURE



Ninety-seven percent of the respondents in this sample perform jobs that are generally equivalent to those identified above. The remaining three percent of the sample did not group into any identifiable cluster or job type.

Group Descriptions

I. Generating Plant Personnel (GRP007). This large cluster of 128 members comprises 82 percent of the survey respondents. For the most part, this cluster is composed of 5-skill level personnel who operate and maintain one or more types of oxygen/nitrogen generating plants in addition to working with liquid oxygen storage containers and air compressors of various sizes. Most of the job types within the cluster seem to overlap considerably in the type of work being performed as well as in the number and kinds of generating plants operated or maintained. The job types differ in the amount of supervisory tasks performed and in the total number of tasks performed. The cluster members as a whole perform a broad range of operation and maintenance tasks, find their job interesting, and perceive their talents and training to be used on their jobs fairly well or better.

a. Oxygen/Nitrogen Generating Plant Operator-Maintainers (GRP039). This job type of 93 members comprises 59 percent of the total sample and contributes in large part to the definition of the Generating Plant Personnel cluster (GRP007). This group performs an average of 248 tasks. Most of the tasks performed relate to the operation and maintenance of oxygen/nitrogen generating plants, air compressors, and support equipment. Only six percent of their average time spent is in the supervisory type duties.

Common tasks include performing plant blowdowns, establishing liquid oxygen purity and production, pumping fluids into cryotainers, establishing gaseous oxygen purity and production, and setting up or operating oxygen/nitrogen tests sets. Eighty-two percent of the members in this job type hold the 5-skill level, with only 12 percent holding a 7-skill level. Only 34 percent of the members are in their first enlistment. The average time in service for group members is nearly seven years, with an average of more than four years in the career field. A large percentage (72 percent) find their job interesting and most members feel that their job uses their talents (85 percent) and training (91 percent) fairly well or better.

All types of oxygen/nitrogen generating plants are operated and maintained by these job type members, with the larger percentages of members operating the 5-ton generating plant. The majority of the individuals in this job type describe themselves as cryogenic plant operators (54 percent) or cryogenic plant shift supervisors (32 percent).

b. Cryogenic Plant NCOICs (GRP037). This job type is made up of seven members representing four percent of the sample. The majority are 7-skill levels (57 percent). Much of their work time is

spent in the operation and maintenance of all sizes of oxygen/nitrogen generating plants. About 31 percent of their time is spent performing supervisory duties. This group performs more tasks on the average (279) than any other job type. Common tasks include connecting or disconnecting cylinders to charging manifolds, troubleshooting air compressors, adjusting air expansion valves for constant high pressure air pressure, performing periodic plant inspections, and inspecting gas storage cylinders for hydrostatic test data. Additionally, members of this group perform a large number of administrative and supervisory tasks, such as developing or improving work methods, analyzing daily logs, assigning work priorities, interpreting policies, directives, or procedures for subordinates, evaluating work schedules, planning and scheduling work assignments, writing airman performance reports (APRs), posting entries on maintenance forms, counseling personnel on military related problems, and conducting OJT.

More than half of the members (57 percent) find their job interesting. In addition, all respondents felt that their job utilized their training fairly well or better.

c. Cryogenic Plant Supervisors (GRP028). This relatively small job type of five members is similar in some ways to the previous job type (Ib) in that members are performing a higher percentage of supervisory tasks and work on the full range of generating plants. However, this group only performs an average of 168 tasks and spends the majority of their time in supervisory areas (22 percent). Most of the group members find their jobs interesting (60 percent) and 60 percent also view their job as using their talents fairly well or better. All respondents in this group also felt that their training was being utilized fairly well or better.

d. 1½ Ton Generating Plant Specialist (GRP032). This final job type within the Generating Plant Personnel cluster is assigned exclusively overseas in USAFE and the Alaskan Air Command. It is a small job type representing only three percent of the survey respondents. None of the group members perform supervision and almost all tasks are related to the 1½ ton generating plant and cryogenics support and storage equipment. On an average, only about four percent of their time is spent in managerial duties. Most of the members (80 percent) have a 5-skill level, with 40 percent of the respondents being in their first enlistment. The group performs a small average number of tasks (125). The job is described as interesting by 40 percent of the group. Forty percent of the members also feel that their training is being used fairly well or better, and 81 percent felt that their talents were being utilized fairly well or better in their job.

Common tasks performed include changing flow-through driers, performing periodic inspections of purging units and vacuum pumps, checking pressure in cosmodyne samplers, cooling down cosmodyne samplers, filling cosmodyne samplers, mixing oxygen test solution, purging cryotainers, and performing plant cooldowns.

II. Liquid Oxygen Storage and Support Equipment Specialist (GRP013). This job type (13 members) has the fewest number of tasks (90) performed by any group in the sample. About 19 percent of their time is spent in managerial duties. For the most part, this group does not work on oxygen/nitrogen generating plants. Rather, most of their tasks relate to storage and support equipment operation and maintenance. Common tasks include transferring fluids between cryotainers or servicing carts, performing liquid product odor tests, removing or installing cryotainer transfer hoses, supervising delivery of commercially delivered cryogenic fluids, packaging or sending cosmodyne samples to laboratories, operating purge units, removing or installing cryotainer line filters, and monitoring cryotainer heatup.

The average time in the career field for the group is just a little over six years. Only 23 percent of the group are in their first enlistment. Most of the members hold a 5-skill level (62 percent) or 7-skill level (38 percent).

About half of the members (46 percent) find their jobs dull and the other half (46 percent) find their jobs interesting. Unlike most of the other groups, the members of this job type feel that their talents are not being used at all on their job (77 percent) and that their training is being utilized little or not at all (69 percent).

III. Senior Cryogenics Supervisors (GRP008). This job type is a small group of 12 senior supervisors who have an average of more than 11 years in the career field and about 17 years of active federal military service. More than 80 percent of the members hold a 7-skill level. None are in their first enlistment. There is a considerable amount of supervision for the group (62 percent of duty time) and a relatively low number of tasks performed (125). Most of the members time is spent in supervisory and administrative duties.

Common tasks performed by these members include supervising 5-and 7-skill level subordinates, directing equipment and maintenance of equipment, evaluating utilization of personnel, establishing directing or implementing quality control programs, maintaining quality control records, counselling subordinates on work progress, and analyzing work load requirements.

A little more than half (58 percent) of the members perceive their jobs as interesting. Most in the group feel that their talents are being utilized fairly well or better (77 percent), and slightly more than half (58 percent) feel that their training is being utilized on their job.

ANALYSIS OF DAFSC GROUPS

In conjunction with the job structure of a career ladder, it is important to examine skill level differences of career ladder members and relate these findings back to the career ladder structure. Table 2 represents the distribution of the survey sample as compared to those actually assigned.

Table 3 reflects the relative percent time spent on duties across the various skill levels. Members of this career ladder generally spend the largest part of their time performing operation and maintenance functions on cryogenic generating plants, cryotainers, and support equipment. Smaller percentages of their time is spent in supervisory or managerial duties.

There were only two personnel in the sample reporting a primary AFSC of 54790 but these were performing in DAFSC 54470 positions. The AFSC 54790, Mechanical Superintendent, is the 9-skill level for four separate career ladders (including heating, refrigeration and air conditioning, and liquid fuels systems). In general 9-skill level personnel are not represented in the sample because, for the most part, all cryogenics plant supervision is performed by 7-skill levels. When an NCO advances to the 9-skill level, he is often moved to a higher level supervisory position over several functions and is not directly supervising cryogenic plant operations.

All three skill levels perform a large number of maintenance tasks, with a high percentage from each group performing several tasks in common (See Table 4). Most of the tasks which are performed by 50 percent or more of survey respondents fall in the operations and maintenance areas. Even at the 7-skill level, personnel are still performing many kinds of operations and maintenance tasks.

A gradual pattern of increasing supervisory responsibility is seen to take place across the DAFSC groups, with an apparent decrease in the amount of time spent by 7-skill levels in operations and maintenance tasks. The differences between tasks performed at the 3- and 5-skill levels relate primarily to maintenance and management tasks (See Table 5). The largest differences between 5- and 7-skill level tasks performed seem to be predominantly in more managerial and supervisory tasks being performed by 7-skill levels rather than technical tasks, as seen in Table 6.

In summary, DAFSC 544X0 personnel were found to perform similar technical tasks across all skill levels. However, increasing supervision and managerial task performance is indicated with increasing skill level. The overall average number of tasks performed remains approximately the same across all DAFSC groups. By the time a 7-skill level is reached, there is an increasing load of managerial tasks, but still 58 percent of the time is spent performing maintenance and operations tasks.

TABLE 2
REPRESENTATION OF DAFSC GROUPS IN SURVEY SAMPLE

<u>DAFSC</u>	<u>ACTUALLY ASSIGNED</u>	<u>SURVEY SAMPLE</u>	<u>PERCENT REPRESENTED</u>
54430	8	8	100
54450	168	111	66
54470	44	38	79

TABLE 3

PERCENT TIME SPENT ON DUTIES BY DAFSC GROUPS

DUTIES	DAFSC 54430 (N=8)	DAFSC 54450 (N=111)	DAFSC 54470 (N=38)
<u>MANAGEMENT, SUPERVISION, ADMINISTRATION</u>			
A PLANNING AND ORGANIZING	-*	1	6
B DIRECTING AND IMPLEMENTING	-*	5	13
C EVALUATING	-*	2	9
D TRAINING	-*	2	6
E MAINTAINING FORMS, LOGS, AND RECORDS	2	5	8
SUBTOTAL	2	15	42
<u>INSTALLATION</u>			
F INSTALLATION OR REMOVAL OF OXYGEN/NITROGEN GENERATING PLANTS	2	1	1
<u>OPERATIONS AND MAINTENANCE</u>			
G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	34	29	15
H OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	8	8	6
I PERFORMING QUALITY CONTROL	5	6	5
J MAINTAINING SUPPORT EQUIPMENT AND CRYOTAINERS	10	11	9
K MAINTAINING AIR COMPRESSOR SYSTEMS	14	10	7
L MAINTAINING EVAPORATIVE CONDENSORS AND COOLING TOWERS	3	2	2
M PERFORMING MAINTENANCE ON REFRIGERATION SYSTEMS OR OXYGEN/NITROGEN GENERATING PLANTS	7	5	4
N PERFORMING GENERAL MAINTENANCE OF OXYGEN/NITROGEN GENERATING	14	13	9
SUBTOTAL	95	84	57

* LESS THAN ONE PERCENT

TABLE 4

REPRESENTATIVE TASKS PERFORMED BY 50 PERCENT OR MORE DAFSC 544X0 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	DAFSC 54430 (N=8)	DAFSC 54450 (N=111)	DAFSC 54470 (N=38)
E2 ANNOTATE CART SERVICING RECORDS	63	77	63
E15 POST ENTRIES ON MAINTENANCE FORMS	75	65	74
F4 INSTALL OR REMOVE AIR COMPRESSOR BELT GUARDS	63	73	53
G1 ADJUST AIR EXPANSION VALVES FOR CONSTANT HIGH PRESSURE PROCESS AIR PRESSURE	100	77	63
G9 ADJUST VALVES TO ESTABLISH CRUDE OR PURE LIQUID LEVELS	100	85	65
G15 CHANGE FLOW-THROUGH DRIERS	75	71	55
G31 ESTABLISH GASEOUS NITROGEN PURITY	100	80	55
H8 OPERATE PURGE UNITS	100	93	79
I2 COOL DOWN COSMODYNE SAMPLERS	88	90	68
I10 PERFORM LIQUID PRODUCT ODOR TEST	100	92	87
J11 PURGE CRYOTAINERS	100	88	74
K8 CHANGE OR ADD OIL IN FORCE-FEED LUBRICATORS	100	86	58
K24 REMOVE OR INSTALL AIR COMPRESSOR BLOWDOWN VALVES	88	70	53
L13 REGULATE COOLING WATER FLOW	63	67	50
M17 INSPECT ELECTRICAL WIRING OR CONNECTIONS	75	52	50
M41 TROUBLESHOOT REFRIGERATION SYSTEMS	63	56	55
N35 FLAIR COPPER TUBING	63	72	55
N103 TROUBLESHOOT AIR SEPARATION SYSTEMS	88	58	55

NUMBER OF COMMON TASKS PERFORMED BY 50 PERCENT OR MORE OF ALL GROUPS - 128

NUMBER OF COMMON TASKS PERFORMED BY 50 PERCENT OR MORE OF 3- AND 5- LEVELS - 177

NUMBER OF COMMON TASKS PERFORMED BY 50 PERCENT OR MORE OF 5- AND 7- LEVELS - 135

TABLE 5

TASKS WHICH BEST DIFFERENTIATE BETWEEN 54430 AND 54450 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	DAFSC 54430	DAFSC 54450	DIFFERENCE
K45 REMOVE OR INSTALL SHIMS TO ADJUST CLEARANCES WITHIN POWER-END ASSEMBLIES	88	46	+42
N46 PRESSURE TEST DRIERS	88	49	+39
K10 CLEAN AIR COMPRESSOR COOLING WATER JACKETS	88	50	+38
K34 REMOVE OR INSTALL AIR COMPRESSOR PISTON RINGS	88	50	+38
G57 SECURE BUILDINGS FOR EXTENDED SHUTDOWNS	100	64	+36
B6 DIRECT EQUIPMENT OPERATION	-	51	-51
N93 SET UP OR OPERATE OXYACETYLENE WELDING EQUIPMENT	12	63	-51
B8 DIRECT MAINTENANCE OF EQUIPMENT	-	48	-48
B3 COUNSEL PERSONNEL ON MILITARY RELATED PROBLEMS	-	38	-38
E4 ANNOTATE TANK INVENTORY SHEET	12	50	-38

TABLE 6
TASKS WHICH BEST DIFFERENTIATE BETWEEN 54450 AND 54470 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	DAFSC 54450	DAFSC 54470	DIFFERENCE
A3 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	6	63	-57
B11 DRAFT CORRESPONDENCE	21	76	-55
A11 ESTABLISH QUALITY CONTROL PROGRAMS	11	66	-55
A2 ASSIGN PERSONNEL TO DUTY POSITIONS	12	66	-54
B17 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	28	82	-54
C24 WRITE AIRMAN PERFORMANCE REPORTS (APR)	33	87	-54
C3 COUNSEL SUBORDINATES ON WORK PROGRESS	26	79	-53
C18 EVALUATE WORK SCHEDULES	11	63	-52
B2 CONDUCT STAFF OR SHOP MEETINGS	14	66	-52
E12 MAINTAIN QUALITY CONTROL RECORDS	24	76	-52
B13 ESTABLISH OR MAINTAIN TECHNICAL ORDER (TO) FILES	20	71	-51
A14 PLAN OR SCHEDULE WORK ASSIGNMENTS	25	76	-51
A7 DEVELOP REQUIREMENTS FOR EQUIPMENT OR SUPPLIES	23	74	-51
A18 SCHEDULES LEAVES OR PASSES	5	55	-50

ANALYSIS OF AFMS GROUPS

Comparisons were also made between personnel grouped on the basis of total active federal military service (TAFMS). AFMS groups are used to reflect variations in tasks performed as a function of different levels of experience in the career ladder. Table 7 indicates the distribution of respondents in each AFMS group represented in the survey sample. With 73 percent of the career field beyond their first enlistment, the career field contains a large percentage of experienced individuals. Table 8 lists the percent time spent on the 14 duty categories by personnel within each AFMS group. In general, the job differences between AFMS groups are similar to those noted for DAFSC groups. The trend toward increasing supervision and management and decreasing operation and maintenance of plants and equipment can be seen more clearly. The total time spent in supervisory areas increases from five percent for the 1-48 month group to 46 percent for the 193+ month group. Inversely, the total percent time spent in the operations and maintenance duties decreases from 93 percent for the first termers (1-48 months) to 52 percent for the 193+ month group. The steady shifting to assuming more and more supervisory responsibilities seems to be the predominant difference between experience groups.

As an aid to career field managers, job interest and perceived utilization of talents and training data for first term and career AFMS groups are shown in Table 9. Sixty-four percent of the career AFMS group perceive their job as interesting, which is lower than the average for the 20 career ladders surveyed during 1977. About 62 percent of first term personnel find their job interesting. Just as in the career group, job interest seems to be about 10 percent lower than the average for previous studies. However, seven percent of the first enlistment groups and six percent of the career group gave no reply to the job interest question which could have some effect on this lower score. There were only two percent of the respondents who did not reply to the utilization of talents question and one percent that did not reply to the utilization of training section. Perceived utilization of talents for both career and first term groups is slightly lower than in previous studies. The perceived utilization of training by first term personnel is 13 percent higher than the average for previous studies, and perceived utilization of training for the career group is slightly above the average. Reenlistment intentions for each of the groups is above the average for previous survey data (See Table 10).

In summary, the progression in experience in the 544X0 career ladder offers a continuing growth into more supervisory type positions with less amount of time being given to technical tasks. Job interest and perceived utilization of talents are somewhat less than average, but perceived utilization of training is higher than average. Overall reenlistment intent seems to be relatively favorable, particularly for career personnel.

TABLE 7

AFMS GROUP DISTRIBUTION OF RESPONDENTS IN SURVEY SAMPLE

	<u>1-48 MONTHS 1ST ENLISTMENT</u>	<u>49-96 MONTHS 2ND ENLISTMENT</u>	<u>97-144 MONTHS 3RD ENLISTMENT</u>	<u>145-192 MONTHS 4TH ENLISTMENT</u>	<u>193 MONTHS AND OVER</u>
NUMBER IN GROUP	42	36	35	18	24
PERCENT OF SAMPLE	27%	23%	23%	12%	15%

TABLE 8
PERCENT TIME SPENT ON DUTIES BY AFMS GROUPS

DUTIES	MONTHS AFMS				
	1-48 (N=42)	49-96 (N=36)	97-144 (N=35)	145-192 (N=19)	193+ (N=24)
<u>MANAGEMENT, SUPERVISION, ADMINISTRATION</u>					
A PLANNING AND ORGANIZING	0	1	3	5	6
B DIRECTING AND IMPLEMENTING	1	4	7	12	14
C EVALUATING	0	1	4	7	10
D TRAINING	1	2	3	4	8
E MAINTAINING FORMS, LOGS, AND RECORDS	3	4	7	8	8
TOTAL	5	12	24	36	46
<u>INSTALLATION</u>					
F INSTALLATION OR REMOVAL OF OXYGEN/NITROGEN GENERATING PLANTS	2	1	1	1	2
<u>OPERATIONS AND MAINTENANCE</u>					
G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	32	30	25	19	11
H OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	9	7	8	7	5
I PERFORMING QUALITY CONTROL	6	5	5	5	5
J MAINTAINING SUPPORT EQUIPMENT AND CRYOTAINERS	12	11	10	10	8
K MAINTAINING AIR COMPRESSOR SYSTEMS	12	11	9	8	7
L MAINTAINING EVAPORATIVE CONDENSORS AND COOLING TOWERS	2	2	2	1	2
M PERFORMING MAINTENANCE ON REFRIGERATION SYSTEMS OF OXYGEN/NITROGEN GENERATING PLANTS	5	5	5	3	5
N PERFORMING GENERAL MAINTENANCE OF OXYGEN/NITROGEN GENERATING PLANTS	15	14	11	10	9
TOTAL	93	85	75	63	52

TABLE 9

EXPRESSION OF JOB INTEREST AND PERCEIVED UTILIZATION OF TALENTS AND TRAINING
FOR FIRST ENLISTMENT AND CAREER AFMS GROUPS
(PERCENT MEMBERS RESPONDING)

	FIRST ENLISTMENT (1-48 MONTHS AFMS)		CAREER (49-193+ MONTHS AFMS)	
	544X0 (N=42)	OTHER *USAF FIELDS	544X0 (N=114)	OTHER *USAF FIELDS
I FIND MY JOB:				
DULL	10	14	17	13
SO-SO	21	14	13	13
INTERESTING	62	72	64	74
NO REPLY	7	0	6	0
MY JOB UTILIZES MY TALENTS:				
NOT AT ALL OR VERY LITTLE	29	28	23	17
FAIRLY WELL OR BETTER	71	72	75	83
NO REPLY	0	0	2	0
MY JOB UTILIZES MY TRAINING:				
NOT AT ALL OR VERY LITTLE	12	25	19	22
FAIRLY WELL OR BETTER	88	75	80	78
NO REPLY	0	0	1	0

* COMPARISON DATA IS BASED ON CAREER LADDERS SURVEYED IN 1977

TABLE 10

REENLISTMENT INTENTIONS OF 544X0 AFMS GROUPS IN SURVEY SAMPLE
(PERCENT MEMBERS RESPONDING)

	544X0 PERSONNEL		OTHER USAF FIELDS*	
	1ST TERM	CAREER	1ST TERM	CAREER
I PLAN TO REENLIST:				
NO, OR PROBABLY NO	45	22	58	31
YES, OR PROBABLY YES	45	76	42	69
NO REPLY	10	2	0	0

* COMPARISON DATA IS BASED ON CAREER LADDERS SURVEYED IN 1977

ANALYSIS OF TASK DIFFICULTY

From a listing of airmen identified for the 544X0 job survey, 66 incumbents holding a 7-skill level from various commands and locations were selected to rate task difficulty. Tasks were rated on a nine-point scale from extremely low to extremely high difficulty, with difficulty defined as the length of time it takes an average incumbent to learn to do the task. Interrater reliability (as assessed through components of variance of standardized group means) among the 66 raters was .97. Ratings were adjusted so that tasks of average difficulty have a rating of 5.00.

A listing of representative tasks rated above average in difficulty is given in Table 11. Generally, tasks rated most difficult are those related to equipment or system troubleshooting, more complicated mechanical tasks such as working on compressor piston rings, and defrosting plants. Tasks usually rated as only slightly above average in difficulty are related to simple mechanical tasks such as removing or installing belts or filters, as well as administrative tasks such as analyzing daily logs or assigning personnel to duty positions.

Table 12 provides a listing of representative tasks rated below average in difficulty. These tasks are generally related to changing lubricants or adding fluids to equipment, simple inspections or valve monitoring, and connecting or disconnecting units or hose fittings.

Job Difficulty Index (JDI)

Having completed the task difficulty index for each inventory item, it is possible to also compute the Job Difficulty Index (JDI) for groups identified in the survey analysis. This index provides a relative measure of which jobs, when compared to other jobs identified, are more or less difficult. The JDI is based on an equation using number of tasks performed and the average difficulty per unit time spent. The index ranks jobs on a scale of 1 to 25. The indices are adjusted so that the average job difficulty index is 13.00. The JDI was computed for the job types and the cluster identified in the career ladder structure.

Table 13 presents the JDIs for career ladder groups. Of the job types, the Liquid Oxygen Storage and Support Equipment Specialists (GRP013) have the lowest JDI (5.3). This appears realistic since most of the tasks rated high in difficulty are related to oxygen/nitrogen generating plant maintenance and this group does few if any of these tasks. The JDI values are also affected, however, by the number of tasks performed and this group only performs 90 tasks as compared to the 1½ Ton Generating Plant Specialists (JDI 7.5) which perform an average of 125 tasks. However, the Cryogenics Senior Supervisors also average 125 tasks with a higher JDI of 13.9. This difference may be accounted for in the increased number of managerial and supervisory tasks performed by this group which are also rated higher than average in job difficulty.

The group with the highest JDI value is the Cryogenic Plant NCOICs (JDI 17.9). These higher skill-level personnel perform more of the troubleshooting and maintenance tasks mentioned previously as most difficult in addition to supervisory tasks. They also perform the highest average number of tasks (279) of any job type group. The Oxygen/Nitrogen Generating Plant Operator-Maintainers had the next highest JDI (14.5), again with a high average number of tasks performed (248).

TABLE 11

TASKS RATED ABOVE AVERAGE IN DIFFICULTY WHICH ARE PERFORMED BY 50 PERCENT OR MORE OF
DAFSC 544X0 RESPONDENTS

TASKS	DIFFICULTY INDEX	PERCENT MEMBERS PERFORMING
K5 ADJUST OR ALIGN AIR COMPRESSOR WRISTPIN BEARING ASSEMBLIES	7.12	57
M41 TROUBLESHOOT REFRIGERATION SYSTEMS	6.68	56
K34 REMOVE OR INSTALL AIR COMPRESSOR PISTON RINGS	6.55	50
K47 TROUBLESHOOT AIR COMPRESSORS	6.23	76
G24 DEFROST PLANTS	5.98	80
B4 DEVELOP OR IMPROVE WORK METHODS OR PROCEDURES	5.94	56
N103 TROUBLESHOOT AIR SEPARATION SYSTEMS	5.94	56
G38 ESTABLISH SIMULTANEOUS PRODUCTS PRODUCTION	5.90	52
N102 TROUBLESHOOT AIR PROCESS SYSTEMS	5.82	57
K18 INSPECT AIR COMPRESSOR POWER-END ASSEMBLIES	5.60	62
B8 DIRECT MAINTENANCE OF EQUIPMENT	5.58	54
M10 CHARGE REFRIGERATION SYSTEMS ON OXYGEN/NITROGEN PLANTS	5.53	54
N93 SET UP OR OPERATE OXYACETYLENE WELDING EQUIPMENT	5.37	59

TABLE 12

TASKS RATED BELOW AVERAGE IN DIFFICULTY WHICH ARE PERFORMED BY 60 PERCENT OR MORE OF
DAFSC 544X0 RESPONDENTS

TASKS	DIFFICULTY INDEX	PERCENT MEMBERS PERFORMING
G48 OPEN OR CLOSE GAS CYLINDER VALVES	2.54	76
I1 CHECK PRESSURE IN COSMODYNE SAMPLERS	2.76	90
G49 PERFORM PLANT BLOWDOWNS	2.88	80
G71 SHUT OFF MAIN CIRCUIT BREAKERS	2.94	82
H4 CONNECT PURGING UNITS TO POWER SOURCES	3.13	87
K8 CHANGE OR ADD OIL IN FORCE-FED LUBRICATORS	3.15	80
G18 CHECK OR ADD WATER TO COOLING WATER SYSTEMS	3.16	67
H6 CONNECT VACUUM PUMPS TO POWER SOURCES	3.20	82
K9 CHANGE OR ADD OIL IN POWER-END ASSEMBLIES	3.24	75
H7 MONITOR CRYOTAINER HEAT UP	3.25	84
G23 CONNECT OR DISCONNECT TRANSFER HOSES	3.40	82
H13 POSITION OR GROUND CRYOTAINERS	3.42	88
J32 VISUALLY INSPECT HOSE FITTINGS ON CRYOTAINERS	3.45	90
J19 REMOVE OR INSTALL HOSES ON PURGING UNITS	3.47	69
J33 VISUALLY INSPECT CRYOTAINER PRESSURE OR CAPACITY GAUGES	3.48	85
H5 CONNECT VACUUM HOSES TO CRYOTAINERS	3.48	87
H3 CONNECT OR DISCONNECT CONTAINER PURGING UNITS	3.51	87

TABLE 13
JOB DIFFICULTY INDICES FOR CAREER LADDER GROUPS

GROUPS	JOB DIFFICULTY INDEX
I. GENERATING PLANT SPECIALISTS (GRP007)	14.0
a. OXYGEN/NITROGEN GENERATING PLANT OPERATOR-MAINTAINERS (GRP039)	14.5
b. CRYOGENICS PLANT NCOICS	17.9
c. CRYOGENICS PLANT SUPERVISORS (GRP037)	13.2
d. 1½ TON GENERATING PLANT SPECIALISTS (GRP032)	7.5
II. LIQUID OXYGEN STORAGE AND SUPPORT EQUIPMENT SPECIALISTS (GRP013)	5.3
III. CRYOGENICS SENIOR SUPERVISORS (GRP008)	13.9

ANALYSIS OF CONUS AND OVERSEAS GROUPS

The percentage of respondents reporting CONUS duty assignments is very small (N=15 or nine percent of the sample). Almost all the CONUS positions are within Air Training Command and the actual duties and tasks performed by this group are highly similar to tasks performed by the overseas group. Since most cryogenic fluids production within CONUS has been contracted by the Air Force, few positions for 544X0 personnel are available in CONUS. However, at present, few distinct differences other than increased activity in training tasks are identifiable to distinguish CONUS from overseas jobs.

ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS

In conjunction with the analysis of DAFSC groups, a comparison was made between the DAFSC job descriptions compiled from survey data and the specialty descriptions in AFR 39-1 for all DAFSCs in the 544X0 career field.

In general, the AFR 39-1 specialty descriptions give a thorough and accurate picture of what 3-, 5-, and 7-skill level personnel are actually doing. Since the AFR 39-1 descriptions are fairly general and do not reflect specific equipment, they seem to accurately describe the high level of homogeneity found across skill levels in the career ladder. The major differences of increasing difficulty and complexity of work with added supervisory responsibilities is accurately captured in the description of the 7-skill level and is consistent with the results found in this job analysis.

COMPARISON OF CURRENT SURVEY TO PREVIOUS SURVEY

The results of this survey were compared to those of Occupational Survey Report AFPT 90-544-110, dated 15 December 1973. In general, there were no major differences in the results of the two studies. The career field has apparently remained fairly stable in terms of the work performed. However, the assigned strength of the career field has been reduced by more than half and the apparent number of CONUS job opportunities within the career ladder appear to have been reduced significantly.

The career ladder structure is similar to the previous study, but no group relating to a CONUS Tactical Air Command group of 2-ton generating plant operator/maintainers was found in this present study. More discrete supervisory job types were also indicated in the current survey and fewer actual clusters of personnel. This may indicate an increasing amount of homogeneity of tasks performed with the decrease in the career field size. Also since the ending of the Vietnam conflict, PACAF and TAC have lost a large percentage of their overseas requirements for AFS 544X0 personnel.

DISCUSSION

The career ladder structure that emerged from this analysis tends to validate the existing classification structure for AFS 544X0 personnel. Generally, personnel in the career ladder seem to be universally assignable to all locations overseas and are able to work on all types of cryogenic plants from their first enlistment on. As members increase in skill level, they acquire greater supervisory responsibility and some expertise in performing more difficult tasks. At the most advanced level of experience, the supervisory role becomes more demanding and fewer tasks related to the maintenance and operation of generating plants are performed. Several job types can be distinguished depending on their involvement in generating plant operation and the level of supervision performed.

The level of difficulty for the various job types differs noticeably among the groups. Management and technical tasks relating to generating plants contribute most to the difficulty factor of the job types but some of the lower difficulty figures associated with three of the job types might be attributed to the small number of tasks performed by these groups.

The problems that seem to be most pressing for the AFS 544X0 career ladder is an attrition rate in the career ladder attributed to the lack of CONUS assignments in the career field. Several attempts have been made to combine the ladder with related career ladders as was recommended by the last occupational survey report.

The career ladder has remained relatively stable in the jobs being performed. Job interest seems to be somewhat low, but reenlistment intentions seem to be favorable. Most career ladder personnel feel that their training is well utilized on their jobs. There does not appear to be any career field management problems other than those associated with multiple overseas assignments. Since the career ladder is relatively stable, it should be resurveyed only on an "as needed" basis.

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APPENDIX A

APPENDIX A

<u>GROUP INDEX</u>	<u>PAGE</u>
I. GENERATING PLANT SPECIALISTS	A1
a. OXYGEN/NITROGEN GENERATING PLANT OPERATOR/MAINTAINERS	A3
b. CRYOGENICS PLANT NCOICs	A5
c. CRYOGENICS PLANT SUPERVISORs	A7
d. 1½ TON GENERATING PLANT SPECIALISTS	A9
II. LOX STORAGE AND SUPPORT EQUIPMENT SPECIALISTs	A11
III. SENIOR CRYOGENICS SUPERVISORS	A13

I. GENERATING PLANT SPECIALISTS (GRP007)

NUMBER IN GROUP: 128 PERCENT OF SAMPLE: 82%

MAJCOM DISTRIBUTION: USAF (55%); PACAF (21%); TAC (7%); ATC (7%); MAC (4%); AAC (3%); USAFA (2%); AFSC (1%)

LOCATION: CONUS (9%), OVERSEAS (91%)

DAFSC DISTRIBUTION: 54430 (6%), 54450 (77%), 54470 (17%)

AVERAGE GRADE: 4.4 JOB DIFFICULTY INDEX: 13.95

AVERAGE TIME IN CAREER FIELD: 54 MONTHS

AVERAGE TIME IN SERVICE: 91 MONTHS

PERCENT MEMBERS IN FIRST ENLISTMENT: 31%

AVERAGE NUMBER SUPERVISED: 3 PERSONS

EXPRESSED JOB INTEREST: DULL (9%), SO-SO (18%), INTERESTING (66%), NOT REPORTED (7%)

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (19%)
FAIRLY WELL OR BETTER (79%)
NOT REPORTED (2%)

PERCEIVED UTILIZATION OF TRAINING: LITTLE OR NOT AT ALL (7%)
FAIRLY WELL OR BETTER (92%)
NOT REPORTED (1%)

AVERAGE NUMBER OF TASKS PERFORMED: 229

GROUP DIFFERENTIATING TASKS:

TASKS

G36 ESTABLISH LIQUID OXYGEN PURITY
G37 ESTABLISH LIQUID OXYGEN PRODUCTION
G32 ESTABLISH GASEOUS OXYGEN PRODUCTION
G33 ESTABLISH GASEOUS OXYGEN PURITY
G49 PERFORM PLANT BLOWDOWNS
N43 PERFORM CORROSION CONTROL
G4 ADJUST VALVES FOR PROPER LIQUID LEVEL
K19 INSPECT AIR COMPRESSOR VALVES
I10 PERFORM LIQUID PRODUCT ODOR TEST
G10 ADJUST VALVES TO ESTABLISH OR MAINTAIN PROPER PRODUCT PURITY

TIME SPENT ON DUTIES:

<u>DUTY</u>	<u>AVERAGE TIME SPENT BY ALL MEMBERS</u>
G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	30
N PERFORMING GENERAL MAINTENANCE OF OXYGEN/NITROGEN GENERATING	14
K MAINTAINING AIR COMPRESSOR SYSTEMS	11
J MAINTAINING SUPPORT EQUIPMENT AND CRYOTAINERS	9

SPECIAL DESCRIPTION

JOB TITLE	PERCENT	SPECIAL TOOLS USED	
Cryogenic Course Technical Inst.	5	None	3
Cryogenic Fluids Technical Advisor	0	Amprobes	13
Cryogenic Plant Maintenance Supv.	5	Electronic Leak Detectors	10
Cryogenic Plant Operator	45	Electronic Motor Analyzers	2
Cryogenic Plant Shift Supervisor	26	Halide Testers	64
Cryogenic Plant Supervisor	6	Lapping Compound Machines	73
Cryogenic Plant Operations Supv.	2	Manometers	61
Cryogenic Quality Control Technician	0	Micrometers	63
Cryogenic Plant Supply Monitor	3	Microns	54
		Moisture Monitors	27
		Multimeters	59
AIR COMPRESSORS MAINT/OPER		Oxygen Acetylene Welding Equip.	76
		Oxygen/Nitrogen Test Sets	95
Operate Chicago Pneumatic Recip. A.C.	24	Purity Test Benches	54
Operate Multistage Inline A.C.	84	Purge Units	97
Operate Utility A.C.	20	Pipe Bending Machines	26
Maintain Chicago Pneumatic Recip. A.C.	20	Pipe Cutting & Threading Equip.	69
Maintain Multistage Inline A.C.	73	Pressure Gauge Tester, Hydraulic	31
Maintain Utility A.C.	14	Prestolite Torch Kits	31
		Service Manifold Gauges	63
		Tachometers	12
		Vacuum Gauges	94
		Vacuum Pumps	94
		Valving Machines	26
		Other	0
OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.			
None	1		
Operate 1 Ton	31		
Operate 1½ Ton	63		
Operate 5 Ton	73		
Maintain 1 Ton	26		
Maintain 1½ Ton	52		
Maintain 5 Ton	67		
Other	6		
CRYOGENIC STORAGE EQUIPMENT			
None	2		
Operate Lox Storage Cart 50 gallons	81		
Operate Lox Storage Cryotainer 150 gal	6		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	83		
Operate Lox Storage Cryotainer 1000 gal	6		
Operate Lox Storage Cryotainer 2000 gal	88		
Operate Lox Storage Cryotainer 5000 gal	68		
Maintain Lox Storage Cart 50 gal	41		
Maintain Lox Storage Cryotainer 150 gal	2		
Maintain Lox Storage Cryotainer 400 gal	32		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	6		
Maintain Lox Storage Cryotainer 2000 gal	82		
Maintain Lox Storage Cryotainer 5000 gal	65		

LAST STATESIDE CAREER FIELD

423X1	0
545X0	13
546X0/F	0
547X0	2
551X1	0
555X0	3
631X0	23
732X0	1
Other	29

ASSIGNED CAREER LADDER	TECH SCHOOL 81%	RETRAINED 7%	DDA OJT 2%
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1a. OXYGEN/NITROGEN GENERATING PLANT OPERATOR/MAINTAINERS (GRP039)

NUMBER IN GROUP: 93

PERCENT OF SAMPLE: 59%

MAJCOM DISTRIBUTION: USAFE (61%); PACAF (23%); TAC (9%); MAC (2%); USAFA (2%);
AAC (1%); ATC (1%); OTHER (1%)

LOCATION: CONUS (3%), OVERSEAS (97%)

DAFSC DISTRIBUTION: 54430 (6%); 54450 (82%); 54470 (12%)

AVERAGE GRADE: 4.3

JOB DIFFICULTY INDEX: 14.46

AVERAGE TIME IN CAREER FIELD: 50 MONTHS

AVERAGE TIME IN SERVICE: 83 MONTHS

PERCENT MEMBERS IN FIRST ENLISTMENT: 34%

AVERAGE NUMBER SUPERVISED: 2

EXPRESSED JOB INTEREST: DULL (8%), SO-SO (13%), INTERESTING (72%),
NOT REPORTED (7%)

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (15%)
FAIRLY WELL OR BETTER (85%)

PERCEIVED UTILIZATION OF TRAINING: LITTLE OR NOT AT ALL (9%)
FAIRLY WELL OR BETTER (91%)

AVERAGE NUMBER OF TASKS PERFORMED: 248

GROUP DIFFERENTIATING TASKS:

TASKS

N43 PERFORM CORROSION CONTROL
G49 PERFORM PLANT BLOWDOWNS
G36 ESTABLISH LIQUID OXYGEN PURITY
G37 ESTABLISH LIQUID OXYGEN PRODUCTION
G63 SET UP OXYGEN/NITROGEN TEST SETS
K25 REMOVE OR INSTALL AIR COMPRESSOR BULL WHEELS

TIME SPENT ON DUTIES:

<u>DUTY</u>	<u>AVERAGE TIME SPENT BY ALL MEMBERS</u>
G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	31
N PERFORMING GENERAL MAINTENANCE OF OXYGEN/NITROGEN GENERATING	15
K MAINTAINING AIR COMPRESSOR SYSTEMS	12
J MAINTAINING SUPPORT EQUIPMENT AND CRYOTAINERS	10
H OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	6

SPECIAL DESCRIPTION

JOB TITLE

Cryogenic Course Technical Inst.	0
Cryogenic Fluids Technical Advisor	0
Cryogenic Plant Maintenance Supv.	4
Cryogenic Plant Operator	54
Cryogenic Plant Shift Supervisor	32
Cryogenic Plant Supervisor	1
Cryogenic Plant Operations Supv.	0
Cryogenic Quality Control Technician	0
Cryogenic Plant Supply Monitor	4

AIR COMPRESSORS MAINT/OPER

Operate Chicago Pneumatic Recip. A.C.	23
Operate Multistage Inline A.C.	84
Operate Utility A.C.	22
Maintain Chicago Pneumatic Recip. A.C.	19
Maintain Multistage Inline A.C.	74
Maintain Utility A.C.	13

OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.

None	0
Operate 1 Ton	29
Operate 1½ Ton	59
Operate 5 Ton	77
Maintain 1 Ton	28
Maintain 1½ Ton	30
Maintain 5 Ton	71
Other	5

CRYOGENIC STORAGE EQUIPMENT

None	1
Operate Lox Storage Cart 50 gallons	88
Operate Lox Storage Cryotainer 150 gal	5
Operate Lox Storage Cryotainer 400 gal	44
Operate Lox Storage Cryotainer 500 gal	85
Operate Lox Storage Cryotainer 1000 gal	5
Operate Lox Storage Cryotainer 2000 gal	90
Operate Lox Storage Cryotainer 5000 gal	76
Maintain Lox Storage Cart 50 gal	50
Maintain Lox Storage Cryotainer 150 gal	0
Maintain Lox Storage Cryotainer 400 gal	37
Maintain Lox Storage Cryotainer 500 gal	86
Maintain Lox Storage Cryotainer 1000 gal	5
Maintain Lox Storage Cryotainer 2000 gal	87
Maintain Lox storage Cryotainer 5000 gal	74

SPECIAL TOOLS USED

None	2
Amprobes	13
Electronic Leak Detectors	13
Electronic Motor Analyzers	1
Halide Testers	66
Lapping Compound Machines	79
Manometers	68
Micrometers	71
Microns	54
Moisture Monitors	31
Multimeters	62
Oxygen Acetylene Welding Equip.	83
Oxygen/Nitrogen Test Sets	98
Purity Test Benches	61
Purge Units	99
Pipe Bending Machines	28
Pipe Cutting & Threading Equip.	74
Pressure Gauge Tester, Hydraulic	33
Prestolite Torch Kits	36
Service Manifold Gauges	71
Tachometers	10
Vacuum Gauges	89
Vacuum Pumps	98
Valving Machines	31
Other	0

LAST STATESIDE CAREER FIELD

423X1	0
545X0	11
546X0/F	0
547X0	2
551X1	0
555X0	2
631X0	24
732X0	1
Other	27

Ib. CRYOGENICS PLANT NCOIC (GRP037)

NUMBER IN GROUP: 7 PERCENT OF SAMPLE: 4%

MAJCOM DISTRIBUTION: USAF (71%); PACAF (14%); MAC (14%); OTHER (1%)

LOCATION: OVERSEAS (100%)

DAFSC DISTRIBUTION: 54450 (43%); 54470 (57%)

AVERAGE GRADE: 5.9 JOB DIFFICULTY INDEX: 17.9

AVERAGE TIME IN CAREER FIELD: 78 MONTHS

AVERAGE TIME IN SERVICE: 171

PERCENT MEMBERS IN FIRST ENLISTMENT: 0%

AVERAGE NUMBER SUPERVISED: 4

EXPRESSED JOB INTEREST: DULL (14%), SO-SO (29%), INTERESTING (57%),

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (29%)
FAIRLY WELL OR BETTER (81%)

PERCEIVED UTILIZATION OF TRAINING: FAIRLY WELL OR BETTER (100%)

AVERAGE NUMBER OF TASKS PERFORMED: 279

GROUP DIFFERENTIATING TASKS:

TASKS

B27 SUPERVISE CRYOGENIC FLUIDS PRODUCTION SPECIALISTS (AFSC 54450)

B4 DEVELOP OR IMPROVE WORK METHODS OR PROCEDURES

A4 ASSIGN WORK PRIORITIES

B8 DIRECT MAINTENANCE OF EQUIPMENT

B10 DIRECT OR IMPLEMENT QUALITY CONTROL PROGRAMS

A14 PLAN OR SCHEDULE WORK ASSIGNMENTS

G57 SECURE BUILDINGS FOR EXTENDED SHUTDOWNS

K47 TROUBLESHOOT AIR COMPRESSORS

K42 REMOVE OR INSTALL AIR COMPRESSOR SUCTION OR DISCHARGE VALVES

G36 ESTABLISH LIQUID OXYGEN PURITY

N96 SILVER SOLDER LINES OR FITTINGS

G30 ESTABLISH GASEOUS NITROGEN PRODUCTION

N102 TROUBLESHOOT AIR PROCESS SYSTEMS

TIME SPENT ON DUTIES:

<u>DUTY</u>	<u>AVERAGE TIME SPENT BY ALL MEMBERS</u>
G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	21
N PERFORMING GENERAL MAINTENANCE OF OXY/NITRO GENERATING	14
B DIRECTING AND IMPLEMENTING	11
C INSPECTING AND EVALUATING	8
K MAINTAINING AIR COMPRESSOR SYSTEMS	8
E MAINTAINING FORMS, LOGS, AND RECORDS	7
A ORGANIZING AND PLANNING	7

SPECIAL DESCRIPTION

JOB TITLE		SPECIAL TOOLS USED	
Cryogenic Course Technical Inst.	0	None	0
Cryogenic Fluids Technical Advisor	0	Amprobes	43
Cryogenic Plant Maintenance Supv.	14	Electronic Leak Detectors	0
Cryogenic Plant Operator	0	Electronic Motor Analyzers	0
Cryogenic Plant Shift Supervisor	14	Halide Testers	100
Cryogenic Plant Supervisor	43	Lapping Compound Machines	57
Cryogenic Plant Operations Supv.	29	Manometer	43
Cryogenic Quality Control Technician	0	Micrometers	43
Cryogenic Plant Supply Monitor	0	Microns	71
		Moisture Monitors	43
		Multimeters	100
AIR COMPRESSORS MAINT/OPER		Oxygen Acetylene Welding Equip.	100
		Oxygen/Nitrogen Test Sets	100
Operate Chicago Pneumatic Recip. A.C.	57	Purity Test Benches	43
Operate Multistage Inline A.C.	100	Purge Units	100
Operate Utility A.C.	14	Pipe Bending Machines	29
Maintain Chicago Pneumatic Recip. A.C.	57	Pipe Cutting & Threading Equip.	86
Maintain Multistage Inline A.C.	100	Pressure Gauge Tester, Hydraulic	43
Maintain Utility A.C.	14	Prestolite Torch Kits	29
		Service Manifold Gauges	57
		Tachometers	14
OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.		Vacuum Gauges	100
		Vacuum Pumps	100
None	0	Valving Machines	14
Operate 1 Ton	57	Other	0
Operate 1½ Ton	57		
Operate 5 Ton	86		
Maintain 1 Ton	57		
Maintain 1½ Ton	57		
Maintain 5 Ton	86		
Other	0		
CRYOGENIC STORAGE EQUIPMENT		LAST STATESIDE CAREER FIELD	
None	0	423X1	0
Operate Lox Storage Cart 50 gallons	71	545X0	57
Operate Lox Storage Cryotainer 150 gal	14	546X0/F	0
Operate Lox Storage Cryotainer 400 gal	43	547X0	0
Operate Lox Storage Cryotainer 500 gal	86	551X1	0
Operate Lox Storage Cryotainer 1000 gal	14	555X0	14
Operate Lox Storage Cryotainer 2000 gal	100	631X0	14
Operate Lox Storage Cryotainer 5000 gal	71	732X0	0
Maintain Lox Storage Cart 50 gal	14	Other	14
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	29		
Maintain Lox Storage Cryotainer 500 gal	71		
Maintain Lox Storage Cryotainer 1000 gal	14		
Maintain Lox Storage Cryotainer 2000 gal	100		
Maintain Lox Storage Cryotainer 5000 gal	71		

1c. CRYOGENICS PLANT SUPERVISOR (GRP028)

NUMBER IN GROUP: 5 PERCENT OF SAMPLE: 3%

MAJCOM DISTRIBUTION: USAF (60%); TAC (20%); MAC (20%)

LOCATION: OVERSEAS (100%)

DAFSC DISTRIBUTION: 54430 (5%); 54450 (77%); 54470 (18%)

AVERAGE GRADE: 5.4 JOB DIFFICULTY INDEX: 13.24

AVERAGE TIME IN SERVICE: 132 MONTHS

PERCENT MEMBERS IN FIRST ENLISTMENT: 0%

AVERAGE NUMBER SUPERVISED: 2.5

EXPRESSED JOB INTEREST: DULL (20%), SO-SO (0%), INTERESTING (60%),
NOT REPORTED (20%)

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (40%)
FAIRLY WELL OR BETTER (60%)

PERCEIVED UTILIZATION OF TRAINING: FAIRLY WELL OR BETTER (100%)

AVERAGE NUMBER OF TASKS PERFORMED: 168

GROUP DIFFERENTIATING TASKS:

TASKS

B27 SUPERVISE CRYOGENIC FLUIDS PRODUCTION SPECIALISTS
C21 PERFORM SAFETY INSPECTIONS OF FACILITIES
A14 PLAN OR SCHEDULE WORK ASSIGNMENTS
G44 INSPECT GAS STORAGE CYLINDERS FOR HYDROSTATIC TEST DATA
N43 INSPECT GAUGES OR LINES
G32 ESTABLISH GASEOUS OXYGEN PRODUCTION
D5 CONDUCT PROFICIENCY TRAINING

TIME SPENT ON DUTIES:

<u>DUTY</u>	<u>AVERAGE TIME SPENT BY ALL MEMBERS</u>
G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	26
B DIRECTING AND IMPLEMENTING	12
E MAINTAINING FORMS, LOGS, AND RECORDS	11
C INSPECTING AND EVALUATING	10
D TRAINING	7
N PERFORMING GENERAL MAINTENANCE OF OXYGEN/NITROGEN GENERATING	7
A ORGANIZING AND PLANNING	6

SPECIAL DESCRIPTION

JOB TITLE		SPECIAL TOOLS USED	
Cryogenic Course Technical Inst.	0	None	20
Cryogenic Fluids Technical Advisor	0	Amprobes	0
Cryogenic Plant Maintenance Supv.	0	Electronic Leak Detectors	0
Cryogenic Plant Operator	0	Electronic Motor Analyzers	0
Cryogenic Plant Shift Supervisor	20	Halide Testers	40
Cryogenic Plant Supervisor	20	Lapping Compound Machines	40
Cryogenic Plant Operations Supv.	20	Manometers	60
Cryogenic Quality Control Technician	0	Micrometers	60
Cryogenic Plant Supply Monitor	0	Microns	80
Other	40	Moisture Monitors	0
		Multimeters	80
		Oxygen Acetylene Welding Equip.	60
		Oxygen/Nitrogen Test Sets	80
		Purity Test Benches	60
		Purge Units	100
		Pipe Bending Machines	20
		Pipe Cutting & Threading Equip.	40
		Pressure Gauge Tester, Hydraulic	40
		Prestolite Torch Kits	40
		Service Manifold Gauges	80
		Tachometers	0
		Vacuum Gauges	80
		Vacuum Pumps	80
		Valving Machines	20
		Other	0
<u>AIR COMPRESSORS MAINT/OPER</u>			
Operate Chicago Pneumatic Recip. A.C.	40		
Operate Multistage Inline A.C.	100		
Operate Utility A.C.	20		
Maintain Chicago Pneumatic Recip. A.C.	20		
Maintain Multistage Inline A.C.	60		
Maintain Utility A.C.	20		
<u>OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.</u>			
None	0		
Operate 1 Ton	80		
Operate 1½ Ton	100		
Operate 5 Ton	80		
Maintain 1 Ton	40		
Maintain 1½ Ton	60		
Maintain 5 Ton	80		
Other	40		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		
Maintain Lox Storage Cryotainer 1000 gal	0		
Maintain Lox Storage Cryotainer 2000 gal	80		
Maintain Lox Storage Cryotainer 5000 gal	60		
<u>CRYOGENIC STORAGE EQUIPMENT</u>			
None	0		
Operate Lox Storage Cart 50 gallons	100		
Operate Lox Storage Cryotainer 150 gal	0		
Operate Lox Storage Cryotainer 400 gal	40		
Operate Lox Storage Cryotainer 500 gal	100		
Operate Lox Storage Cryotainer 1000 gal	0		
Operate Lox Storage Cryotainer 2000 gal	80		
Operate Lox Storage Cryotainer 5000 gal	80		
Maintain Lox Storage Cart 50 gal	0		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	80		

1d. 1½ TON GENERATING PLANT SPECIALISTS (GRP032)

NUMBER IN GROUP: 5 PERCENT OF SAMPLE: 3%

MAJCOM DISTRIBUTION: USAF (60%); AAC (40%)

LOCATION: OVERSEAS (100%)

DAFSC DISTRIBUTION: 54430 (20%); 54450 (80%)

AVERAGE GRADE: 4.2 JOB DIFFICULTY INDEX: 7.47

AVERAGE TIME IN CAREER FIELD: 42 MONTHS

AVERAGE TIME IN SERVICE: 70 MONTHS

PERCENT MEMBERS IN FIRST ENLISTMENT: 40%

AVERAGE NUMBER SUPERVISED: 0

EXPRESSED JOB INTEREST: DULL (20%), SO-SO (20%), INTERESTING (40%),
NOT REPORTED (20%)

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (40%)
FAIRLY WELL OR BETTER (40%)
NOT REPORTED (20%)

PERCEIVED UTILIZATION OF TRAINING: LITTLE OR NOT AT ALL (20%)
FAIRLY WELL OR BETTER (60%)
NOT REPORTED (20%)

AVERAGE NUMBER OF TASKS PERFORMED: 125

GROUP DIFFERENTIATING TASKS:

TASKS

G15 CHANGE FLOW-THROUGH DRIERS
J8 PERFORM PERIODIC INSPECTIONS OF PURGING UNITS
J9 PERFORM PERIODIC INSPECTIONS OF VACUUM PUMPS
G46 MIX NITROGEN TEST SOLUTIONS
G64 SET VALVES FOR DEFROST
I1 CHECK PRESSURE IN COSMODYNE SAMPLER

TIME SPENT ON DUTIES:

DUTY

AVERAGE TIME SPENT
BY ALL MEMBERS

G OPERATING OXYGEN/NITROGEN GENERATING PLANTS	42
J MAINTAINING SUPPORT EQUIPMENT AND CRYOTAINERS	13
H OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	11
I PERFORMING QUALITY CONTROL	7
K MAINTAINING AIR COMPRESSOR SYSTEMS	6

SPECIAL DESCRIPTION

<u>JOB TITLE</u>		<u>SPECIAL TOOLS USED</u>	
Cryogenic Course Technical Inst.	0	None	0
Cryogenic Fluids Technical Advisor	0	Amprobes	20
Cryogenic Plant Maintenance Supv.	0	Electronic Leak Detectors	20
Cryogenic Plant Operator	80	Electronic Motor Analyzers	40
Cryogenic Plant Shift Supervisor	0	Halide Testers	40
Cryogenic Plant Supervisor	0	Lapping Compound Machines	20
Cryogenic Plant Operations Supv.	0	Manometers	40
Cryogenic Quality Control Technician	0	Micrometers	40
Cryogenic Plant Supply Monitor	0	Microns	60
Other	20	Moisture Monitors	40
<u>AIR COMPRESSORS MAINT/OPER</u>		Multimeters	60
Operate Chicago Pneumatic Recip. A.C.	20	Oxygen Acetylene Welding Equip.	60
Operate Multistage Inline A.C.	80	Oxygen/Nitrogen Test Sets	80
Operate Utility A.C.	20	Purity Test Benches	20
Maintain Chicago Pneumatic Recip. A.C.	0	Purge Units	80
Maintain Multistage Inline A.C.	60	Pipe Bending Machines	20
Maintain Utility A.C.	20	Pipe Cutting & Threading Equip.	0
<u>OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.</u>		Pressure Gauge Tester, Hydraulic	40
None	0	Prestolite Torch Kits	0
Operate 1 Ton	20	Service Manifold Gauges	20
Operate 1½ Ton	80	Tachometers	0
Operate 5 Ton	0	Vacuum Gauges	80
Maintain 1 Ton	0	Vacuum Pumps	80
Maintain 1½ Ton	60	Valving Machines	20
Maintain 5 Ton	0	Other	0
Other	0	<u>LAST STATESIDE CAREER FIELD</u>	
<u>CRYOGENIC STORAGE EQUIPMENT</u>		423X1	0
None	0	545X0	0
Operate Lox Storage Cart 50 gallons	80	546X0/F	0
Operate Lox Storage Cryotainer 150 gal	20	547X0	0
Operate Lox Storage Cryotainer 400 gal	40	551X1	0
Operate Lox Storage Cryotainer 500 gal	80	555X0	0
Operate Lox Storage Cryotainer 1000 gal	20	631X0	0
Operate Lox Storage Cryotainer 2000 gal	60	732X0	0
Operate Lox Storage Cryotainer 5000 gal	20	Other	20
Maintain Lox Storage Cart 50 gal	40		
Maintain Lox Storage Cryotainer 150 gal	20		
Maintain Lox Storage Cryotainer 400 gal	20		
Maintain Lox Storage Cryotainer 500 gal	60		
Maintain Lox Storage Cryotainer 1000 gal	20		
Maintain Lox Storage Cryotainer 2000 gal	20		
Maintain Lox Storage Cryotainer 5000 gal	0		

II. LOX STORAGE AND SUPPORT EQUIPMENT SPECIALIST (GRP013)

NUMBER IN GROUP: 13 PERCENT OF SAMPLE: 8%

MAJCOM DISTRIBUTION: USAFE (38%); MAC (31%); AAC (23%); TAC (8%)

LOCATION: OVERSEAS (100%)

DAFSC DISTRIBUTION: 54450 (62%); 54470 (38%)

AVERAGE GRADE: 4.8 JOB DIFFICULTY INDEX: 5.31

AVERAGE TIME IN CAREER FIELD: 74 MONTHS

AVERAGE TIME IN SERVICE: 117 MONTHS

PERCENT MEMBERS IN FIRST ENLISTMENT: 23%

AVERAGE NUMBER SUPERVISED: 2

EXPRESSED JOB INTEREST: DULL(46%), SO-SO (0%), INTERESTING (46%),
NOT REPORTED (8%)

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (77%)
FAIRLY WELL OR BETTER (33%)

PERCEIVED UTILIZATION OF TRAINING: LITTLE OR NOT AT ALL (69%)
FAIRLY WELL OR BETTER (31%)

AVERAGE NUMBER OF TASKS PERFORMED: 90

GROUP DIFFERENTIATING TASKS:

TASKS

H16 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS
I10 PERFORM LIQUID PRODUCT ODOR TESTS
H10 PERFORM PRE-OPERATIONAL INSPECTIONS OF CRYOTAINERS
H14 SET CRYOTAINER VALVES
H13 POSITION OR GROUND CRYOTAINERS
J16 REMOVE OR INSTALL CRYOTAINER TRANSFER HOSES
H15 SUPERVISE DELIVERY OF COMMERCIALLY DELIVERED CRYOGENIC FLUIDS

TIME SPENT ON DUTIES:

<u>DUTY</u>	<u>AVERAGE TIME SPENT BY ALL MEMBERS</u>
J MAINTAINING SUPPORT EQUIPMENT AND CRYOTAINERS	32
H OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	21
I PERFORMING QUALITY CONTROL	11
E MAINTAINING FORMS, LOGS, AND RECORDS	10
B DIRECTING AND IMPLEMENTING	9

SPECIAL DESCRIPTION

JOB TITLE		SPECIAL TOOLS USED	
Cryogenic Course Technical Inst.	0	None	15
Cryogenic Fluids Technical Advisor	0	Amprobes	0
Cryogenic Plant Maintenance Supv.	8	Electronic Leak Detectors	8
Cryogenic Plant Operator	15	Electronic Motor Analyzers	0
Cryogenic Plant Shift Supervisor	8	Halide Testers	15
Cryogenic Plant Supervisor	0	Lapping Compound Machines	8
Cryogenic Plant Operations Supv.	8	Manometers	15
Cryogenic Quality Control Technician	0	Micrometers	8
Cryogenic Plant Supply Monitor	0	Microns	31
Other	62	Moisture Monitors	8
AIR COMPRESSORS MAINT/OPER		Multimeters	8
Operate Chicago Pneumatic Recip. A.C.	39	Oxygen Acetylene Welding Equip.	31
Operate Multistage Inline A.C.	39	Oxygen/Nitrogen Test Sets	39
Operate Utility A.C.	23	Purity Test Benches	15
Maintain Chicago Pneumatic Recip. A.C.	39	Purge Units	92
Maintain Multistage Inline A.C.	46	Pipe Bending Machines	8
Maintain Utility A.C.	15	Pipe Cutting & Threading Equip.	15
OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.		Pressure Gauge Tester, Hydraulic	0
None	62	Prestolite Torch Kits	8
Operate 1 Ton	8	Service Manifold Gauges	8
Operate 1½ Ton	23	Tachometers	0
Operate 5 Ton	8	Vacuum Gauges	85
Maintain 1 Ton	0	Vacuum Pumps	85
Maintain 1½ Ton	15	Valving Machines	0
Maintain 5 Ton	8	Other	0
Other	8	LAST STATESIDE CAREER FIELD	
CRYOGENIC STORAGE EQUIPMENT		423X1	0
None	0	545X0	23
Operate Lox Storage Cart 50 gallons	62	546X0/F	0
Operate Lox Storage Cryotainer 150 gal	0	547X0	0
Operate Lox Storage Cryotainer 400 gal	23	551X1	0
Operate Lox Storage Cryotainer 500 gal	92	555X0	0
Operate Lox Storage Cryotainer 1000 gal	0	631X0	31
Operate Lox Storage Cryotainer 2000 gal	100	732X0	8
Operate Lox Storage Cryotainer 5000 gal	54	Other	23
Maintain Lox Storage Cart 50 gal	15		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	31		
Maintain Lox Storage Cryotainer 500 gal	92		
Maintain Lox Storage Cryotainer 1000 gal	8		
Maintain Lox Storage Cryotainer 2000 gal	92		
Maintain Lox Storage Cryotainer 5000 gal	54		

III. SENIOR CRYOGENIC SUPERVISORS (GRP008)

NUMBER IN GROUP: 12

PERCENT OF SAMPLE: 8%

MAJCOM DISTRIBUTION: USAFE (50%); MAC (25%); PACAF (8%); ATC (8%)

LOCATION: CONUS (8%), OVERSEAS (92%)

DAFSC DISTRIBUTION: 54450 (17%); 54470 (83%)

AVERAGE GRADE: 6

JOB DIFFICULTY INDEX: 13.93

AVERAGE TIME IN CAREER FIELD: 136 MONTHS

AVERAGE TIME IN SERVICE: 207 MONTHS

PERCENT MEMBERS IN FIRST ENLISTMENT: 0%

AVERAGE NUMBER SUPERVISED: 8

EXPRESSED JOB INTEREST: DULL (33%), SO-SO (9%), INTERESTING (58%).

PERCEIVED UTILIZATION OF TALENTS: LITTLE OR NOT AT ALL (33%)
FAIRLY WELL OR BETTER (77%)

PERCEIVED UTILIZATION OF TRAINING: LITTLE OR NOT AT ALL (42%)
FAIRLY WELL OR BETTER (58%)

AVERAGE NUMBER OF TALSK PERFORMED: 125

GROUP DIFFERENTIATING TASKS:

TASKS

B27 SUPERVISE CRYOGENIC FLUIDS PRODUCTION SPECIALISTS (AFSC 54450)

B8 DIRECT MAINTENANCE OF EQUIPMENT

C17 EVALUATE UTILIZATION OF PERSONNEL.

A11 ESTABLISH QUALITY CONTROL PROGRAMS

B2 CONDUCT STAFF OR SHOP MEETINGS

C1 ANALYZE WORKLOAD REQUIREMENTS

C18 EVALUATE WORK SHCEDULES

TIME SPENT ON DUTIES:

DUTY

**AVERAGE TIME SPENT
BY ALL MEMBERS**

B DIRECTING AND IMPLEMENTING

23

C INSPECTING AND EVALUATING

18

E MAINTAINING FORMS, LOGS, AND RECORDS

11

A ORGANIZING AND PLANNING

11

D TRAINING

10

I PERFORMING QUALITY CONTROL

5

SPECIAL DESCRIPTION

JOB TITLE		SPECIAL TOOLS USED	
Cryogenic Course Technical Inst.	0	None	0
Cryogenic Fluids Technical Advisor	8	Amprobes	50
Cryogenic Plant Maintenance Supv.	0	Electronic Leak Detectors	58
Cryogenic Plant Operator	0	Electronic Motor Analyzers	8
Cryogenic Plant Shift Supervisor	0	Halide Testers	92
Cryogenic Plant Supervisor	58	Lapping Compound Machines	58
Cryogenic Plant Operations Supv.	25	Manometers	50
Cryogenic Quality Control Technician	0	Micrometers	58
Cryogenic Plant Supply Monitor	0	Microns	58
Other	8	Moisture Monitors	42
AIR COMPRESSORS MAINT/OPER		Multimeters	83
Operate Chicago Pneumatic Recip. A.C.	75	Oxygen Acetylene Welding Equip.	100
Operate Multistage Inline A.C.	83	Oxygen/Nitrogen Test Sets	92
Operate Utility A.C.	58	Purity Test Benches	75
Maintain Chicago Pneumatic Recip. A.C.	67	Purge Units	92
Maintain Multistage Inline A.C.	75	Pipe Bending Machines	33
Maintain Utility A.C.	50	Pipe Cutting & Threading Equip.	67
OXYGEN/NITROGEN GENERATING PLANTS OPER/SUPV.		Pressure Gauge Tester, Hydraulic	8
None	8	Prestolite Torch Kits	42
Operate 1 Ton	50	Service Manifold Gauges	83
Operate 1½ Ton	58	Tachometers	33
Operate 5 Ton	50	Vacuum Gauges	83
Maintain 1 Ton	42	Vacuum Pumps	100
Maintain 1½ Ton	58	Valving Machines	17
Maintain 5 Ton	50	Other	0
Other	17	LAST STATESIDE CAREER FIELD	
CRYOGENIC STORAGE EQUIPMENT		423X1	0
None	0	545X0	33
Operate Lox Storage Cart 50 gallons	75	546X0/F	0
Operate Lox Storage Cryotainer 150 gal	0	547X0	0
Operate Lox Storage Cryotainer 400 gal	33	551X1	0
Operate Lox Storage Cryotainer 500 gal	92	555X0	25
Operate Lox Storage Cryotainer 1000 gal	8	631X0	0
Operate Lox Storage Cryotainer 2000 gal	83	732X0	0
Operate Lox Storage Cryotainer 5000 gal	42	Other	25
Maintain Lox Storage Cart 50 gal	42		
Maintain Lox Storage Cryotainer 150 gal	0		
Maintain Lox Storage Cryotainer 400 gal	8		
Maintain Lox Storage Cryotainer 500 gal	67		
Maintain Lox Storage Cryotainer 1000 gal	8		
Maintain Lox Storage Cryotainer 2000 gal	67		
Maintain Lox Storage Cryotainer 5000 gal	33		